FOCUS ON VOCABULARY AND LANGUAGE

Page 229: . . . ill will . . . If you feel *ill will* toward someone, you are hostile or unfriendly to that person. Because of her *prosopagnosia* (face blindness), Heather Sellers does not recognize the faces of people she has encountered previously and thus will not dislike (*feel ill will toward*) them—even if they have annoyed her on previous occasions. What is interesting about this case is that Sellers can process incoming sensory information but has trouble organizing and interpreting sensory input about faces. As Myers notes, she has normal **sensation** but her **perception** is not working properly when it comes to faces.

Sensing the World: Some Basic Principles

Page 230: A frog could starve to death *knee-deep in motionless flies*. But let one *zoom by* and the frog's *"bug detector"* cells *snap awake.* The frog's eyes and brain are organized in such a way that only fast moving (*zooming*), small, dark objects will cause its specialized feature detector nerve cells (*"bug detectors"*) to become active (*snap awake*). A frog that is surrounded by flies that do not move (is *knee-deep in motionless flies*) will die of hunger, completely unaware of the food at its feet.

Page 231: The *shades* on our own senses are open just a *crack*, allowing us only a restricted awareness of this *vast sea* of energy. Just as sunblinds or curtains (*shades*) let in only a little light through any small opening (*a crack*), our sensory system is able to detect only a very small part of the large amount (*vast sea*) of the physical energy that exists in the world.

Page 231: Exhausted parents will notice *the faintest whimper* from a newborn's *cradle* . . . In **signal detection theory** there is no single **absolute threshold** for detecting stimuli; it all depends on the situation. Thus, parents who are sleeping soundly are more likely to become aware of the quietest cry of distress (*the faintest whimper*) from their infant in his small bed (*cradle*) than of a much louder but irrelevant noise.

Page 233: . . . hucksters . . . A *huckster* is someone who sells merchandise that may be of dubious value. Those who promote and sell **subliminal** tapes (*hucksters*) make claims that are not supported by scientific research. In fact, the available evidence suggests that subliminal tapes do not have the profound, enduring effects on behavior claimed by their marketers.

Page 234: Even after living two years in Scotland, sheep *baa's* all sound alike to my ears. But not to those *ewes*, which I have observed *streaking*, after *shearing*, directly to the *baa* of their lamb amid the *chorus* of other distressed lambs. There are many sheep in Scotland and their characteristic call is the sound "baa." One "baa" sounds much the same as another to most people, but not to the mother sheep (*ewe*). She can detect her distressed offspring's "baa" from among a whole group (*chorus*) of "baaing" lambs—even after being briefly separated while having her wool coat shaved off (*sheared*). She will run very rapidly (*streak*) to rejoin her own lamb, who's call she is easily able to distinguish from all the others because she has the capacity to detect minute or small differences among very similar "baaing" sounds (the **difference threshold** or *just-noticeable difference, jnd*).

Page 235: So everywhere that Mary looks, the scene is sure to go. To understand this sentence, you need to be familiar with the old nursery rhyme: "Mary had a little lamb, its fleece was white as snow, and *everywhere that Mary went the lamb was sure to go*." When a volunteer (*Mary*) is fitted with a special contact lens with a miniature projector, she sees the same image no matter where her eyes "look" (*everywhere that Mary looks, the scene is sure to go*). When an image is projected onto the **retina** in this manner, the scene disappears bit by bit and then reappears and disappears again (in meaningful units, recognizable fragments, or as a whole). This happens because the image, which normally would be moving back and forth rapidly (*quivering*) as a result of tiny eye movements, is now stationary with respect to the retina and its receptors. As the receptors fatigue the image disappears.

Vision

Page 239: . . . ***blind spot . . .*** You can use the suggestion in Figure 6.9 of your text to demonstrate that there are two small parts of your visual field (one in the left and one in the right) where you have no sight. These tiny areas (*blind spots*) are where the **optic nerve** exits the eye.

Page 239: Rods have no such *hotline* [to the brain] . . . **Cones**, which are mostly clustered in the **fovea** and detect color and fine detail, have many more individual connections to the brain than **rods**. Rods, which give us our black-and-white vision, have to share bipolar cells. For this reason, rods do not have as many individual connections (*hotlines*) to the brain. However, in dim light this can be an advantage as several rods can focus or funnel their individual faint energy output onto a single bipolar cell.

Page 242 (caption): The answer to this question is the *Holy Grail* of vision research. The reference here is to the medieval legend that the cup (*grail*) Jesus Christ drank from at the Last Supper, which was later used to catch his blood when he was crucified, survived and may have been brought to England. The quest, or search, for this sacred cup (the *Holy Grail*) symbolized spiritual regeneration and enlightenment. Similarly, attempting to answer the question about how the brain deals with multiple aspects of a visual scene simultaneously, automatically, and without our awareness (*parallel processing*), is an important undertaking that, if successful, will enlighten us about brain functioning (*the Holy Grail of vision research*).

Page 242: . . . blindsight . . . Blindsight refers to the fact that some people with neurological damage have the ability to see, to some degree, without any conscious awareness of the visual experience. They are blind, yet they can see (*blindsight*). This suggests that there are two parallel processing systems operating—one that unconsciously guides our actions and one that gives us our conscious perceptions.

Page 243: Color, like all aspects of vision, resides not in the object but in the *theater of our brains*, as *evidenced* by our dreaming in color. Myers notes that when we view a colored object (for example, a blue balloon), it absorbs all the wavelengths except its own (blue) and reflects the wavelengths of blue back to us. The color we perceive is a product of our brain and exists only in the perceiver's mind (the *theater of the brain*). This idea is supported (*evidenced*) by the fact that we dream in color, an internally generated experience (a *mental construction*).

Hearing

Page 245: We also are acutely sensitive to *faint sounds,* an obvious *boon* for our ancestors' survival when *hunting* or *being hunted,* or for detecting a *child's whimper*. Humans are very good at detecting very quiet noises (*faint sounds*). This was clearly beneficial (a *boon*) to our predecessors' ability to survive when they were both predator (*hunter*) and prey (*being hunted*). Likewise, the ability to notice and respond to a youngster's quiet cry of distress (*a child's whimper*) would have had adaptive value. We are also very sensitive to changes in sounds and we have the ability to differentiate among thousands of human voices.

Page 246: A *violin* produces much shorter, faster sound waves than does a *cello.* Musical instruments produce stimulus energy called *sound waves*—molecules of air that bump and push each other along—and these may be long (*low frequency*) or short (*high frequency*). A *cello* (a large, deep-toned, stringed instrument) produces low-frequency sound waves and thus has a lower pitch than a *violin* (a much smaller stringed instrument, also called a fiddle), which produces high-frequency waves and has a higher pitch.

Page 248: . . . ringing of the ears . . . We sometimes continue to hear high-pitched sounds even after the loud noise to which we were exposed—noisy machinery, loud cheering crowds (*frenzied sports arenas*), or the maximum volume music—is no longer present. This phenomenon is referred to as "*ringing of the ears.*" Such ringing may indicate damage to the

hair cells and perhaps eventual hearing loss. Myers notes, as pain alerts us to possible bodily harm, ringing of the ears alerts us to hearing damage—our hearing's equivalent of bleeding.

Page 249: If a car to the right *honks,* your right ear receives a more *intense* sound, and it receives sound slightly *sooner* than your left ear. We locate sounds because our ears are about 6 inches apart and there is a time, as well as a loudness, difference between auditory reception in each ear. If we hear the sound of a car horn (it *honks*) to our right, the left ear receives a less intense sound somewhat later than the right ear. Thus, we locate the direction of the sound to the right.

Page 250: That is why, when trying to *pinpoint* a sound, you *cock your head,* so that your two ears will receive slightly different messages. When a sound is *equidistant* from our two ears (directly ahead, behind, or above) and there is no visual clue, we have trouble locating (*pinpointing*) its source. In this situation, it helps to tilt (*cock*) our heads so that each ear receives a slightly different message (that is, the sound will be a little louder and sensed a little sooner by one ear, and the brain uses this information to detect where the sound is coming from).

Page 250: Occasionally, disease causes sensorineural hearing loss, but more often the *culprits* are biological changes linked with heredity, aging, and prolonged exposure to *ear-splitting* noise or music. **Sensorineural hearing loss** or *nerve deafness* (cochlear damage) can sometimes be caused by illness, but the agents responsible (*the culprits*) are more likely to be age-related biological factors and extended encounters with extremely loud (*ear-splitting*) music or noise. While digital hearing aids are a partial remedy, the latest cochlear implants can restore hearing for children and most adults.

Other Important Senses

Page 253: As lovers, *we yearn* to touch—to kiss, to stroke, to *snuggle.* Our sense of touch involves a mixture of at least four distinct senses: pressure, warmth, cold, and pain. Intimate relations often involve a desire or longing (*we yearn*) to caress, kiss, and closely embrace each other (*snuggle*).

Page 254: The biological *gyroscopes* for this sense of *equilibrium* are in your inner ear. A *gyroscope* is a mechanical device used as a stabilizer in scientific and navigation instruments. Likewise, we have biological stabilizers that monitor the movement and position of our bodies and provide us with a sense of balance (*equilibrium*). These biological stabilizers are called the *semicircular canals* and the *vestibular sacs* and are located in the inner ear.

Page 255: Rubbing the area around your *stubbed toe* will create competing stimulation that will *block* some pain messages. If you hit your toe against a solid object (*stub your toe*), it really hurts. If, however, you massage (*rub*) the area around the sore spot, it makes you feel better because stimulation interferes with (*blocks*) some pain messages. This supports the **gate-control** model, which suggests that this stimulation (*rubbing*) will activate "gate-closing" in large neural fibers and, thus, will reduce pain.

Page 257: Sometimes the *pain in sprain is mainly in the brain*—literally. Here, Myers is doing a parody of the lyrics from a song in the musical *My Fair Lady,* "The rain in Spain stays mainly in the plain." The main point: reports of repetitive strain injury (the *pain in sprain*) were, in the case of groups (*pockets*) of Australian keyboard operators, due to social and psychological influences (*mainly in the brain*) and were not the result of damaged ligaments or muscles in the hands or arms, as is usually the case.

Page 258: A well-trained nurse may distract *needle-shy patients* by chatting with them and asking them to look away when inserting the needle. One method of pain control is through distraction. If you are nervous or anxious about being injected with a hypodermic needle (*a needle-shy patient*), the nurse may talk to you about unimportant matters (*she chats with you*) and request that you do not watch the procedure. This type of distraction can reduce the intensity of the pain.

Page 259: Essential as taste buds are, *there's more to taste than meets the tongue*. The common expression *"there is more to this than meets the eye"* suggests that there is something extra going on over and above the obvious or apparent. Myers creates a variation of this expression using a different sense (taste). The flavors we experience are a function of more than just the taste buds in the tongue; they involve **sensory interaction** between taste and the sense of smell (*olfaction*). Thus, the sense of taste involves more than simply responding to chemicals that stimulate taste receptors in the tongue (*there is more to taste than meets the tongue*).

Page 260: Between those two moments, you will daily inhale and exhale nearly 20,000 breaths of life-sustaining air, *bathing* your *nostrils* in *a stream of scent-laden molecules*. Smell (*olfaction*) is a chemical sense. As substances (flowers, feet, fish, fertilizer, etc.) release molecules, they are carried by the air we breathe (*a stream of scent-laden molecules*) and wash over (*bathe*) receptors in our nasal cavities (*nostrils*).

Page 262: Words more readily *portray* the sound of coffee brewing than its *aroma*. It is easier to talk about and describe (*portray*) the subtle aspects of coffee brewing than to put into words the sensory qualities involved in the smell (*aroma*) of coffee. *Olfaction* seems to be a more primitive sense than vision or **audition**.

Perceptual Organization

Page 265: Such principles usually help us construct reality. Sometimes, however, they *lead us astray . . .* Although we put together elements of sensation through active organization (the **Gestalt** grouping principles) and end up with a unitary experience, we sometimes make mistakes in the process (*we are led astray*).

Page 266: When the infants' mothers then *coaxed* them to *crawl* out onto the glass, most refused to do so, indicating that they could perceive depth. In the experiment with the **visual cliff**, 6- to 14-month-old children were gently encouraged (*coaxed*) by their mothers to move on their hands and knees (*crawl*) onto the invisible glass top on the "deep" side of the apparatus. Most could not be persuaded to do so, leading to the conclusion that **depth perception** may be innate (*inborn*). The idea for this famous experiment came to Eleanor Gibson when she was at the Grand Canyon and wondered if a young child (*toddler*) looking (*peering*) over the edge of the canyon would recognize the steep, unsafe, incline (*dangerous drop-off*) and retreat (*draw back*).

Page 267: The floating *finger sausage* (Figure 6.33). Try the demonstration and you will experience the effect of **retinal disparity**. You will see a tubular shape (*finger sausage*) made by your brain from the two different images of your fingers.

Page 268: As we move, objects that are actually *stable* may appear to move. Things that are stationary and do not move (*stable objects*) seem to move relative to us when we move.

Page 269: As film animation artists know well, you can create this illusion by flashing 24 still pictures a second. When we view a film, we do not experience a rapid series of nonmoving images (*still pictures*); rather, our brain constructs the perceived motion. This is called *stroboscopic movement*.

Page 270: Take away these distance cues—by looking at the horizon Moon (or each monster or each bar) through a *paper tube*—and the object immediately *shrinks*. Observers have argued for centuries about why the Moon near the horizon seems so much larger than the Moon overhead in the sky. One explanation involves the interaction of perceived size and perceived distance. Distance cues at the horizon make the Moon appear farther away than when it is overhead (where there are no distance cues). The Moon casts the *same retinal image* in both situations, so the image that appears to be more distant (i.e., near the horizon) will therefore seem larger. We can eliminate the distance cues by looking at the Moon through a rolled-up piece of paper (a *paper tube*); the Moon will appear much smaller (*it shrinks*).

Perceptual Interpretation

Page 273: Most had been born with cataracts—clouded lenses that allowed them to see only diffused light, rather as you or I might see a diffuse fog through a *Ping-Pong* ball sliced in half. People born with cataracts cannot see clearly because the normally transparent lenses in their eyes are opaque. To understand what their vision is like, imagine what you would see if you had your eyes covered with half of a small, white, plastic ball that is used in table tennis (*Ping-Pong*). When cataract patients have their vision restored, after being blind since birth, they can sense colors and distinguish figure from ground (*innate* capacities), but they cannot visually recognize things that were familiar by touch.

Page 274: Given a new pair of glasses, we may feel slightly disoriented, even dizzy. When we start wearing ordinary eyeglasses or when we are fitted with a new pair, our initial reaction is a little confusion and vertigo (*dizziness*). However, we quickly adapt within a few days. We can also adapt to lenses that distort what we are looking at by 40 degrees to one side, and even to distortion lenses that invert reality (by turning the visual image upside down—*a topsy-turvy world*). Fish, frogs, salamanders, and young chickens cannot adapt in this way.

Page 275: As everyone knows, *to see is to believe.* As we less fully appreciate, *to believe is to see.* The expression *"seeing is believing"* means that we put much reliance on visual information when deciding (*believing*) what is true. Myers shows us that, on the contrary, what we *believe* may actually affect what we *see*. Our assumptions, expectations, and mental predispositions (our **perceptual sets**) determine, to a large extent, our perceptions.

Page 275: In 1972, a British newspaper published genuine, unretouched photographs of *a "monster"* in Scotland's Loch Ness . . . People who had heard about, or believed in, the Loch Ness Monster before seeing a very ambiguous picture of a log were more inclined to see what they expected to see (i.e., *a monster*) because of their **perceptual set**.

Page 276: Clearly, much of what we perceive comes not just from the world "out there" but also *from what's behind our eyes and between our ears.* Myers is reiterating the point that our mental predispositions, expectations, beliefs, etc. (*what's behind our eyes and between our ears*) influence much more of what we perceive than the sensory stimulation received from the outside world.

Page 278: Some differences, it seems, exist merely in the eyes of their beholders. The familiar saying *"beauty is in the eye of the beholder"* means that what is perceived as beautiful has more to do with what the perceiver subjectively believes than with the absolute qualities of the person or object being judged. Likewise, our *stereotypes* (rigid, conventional ideas or beliefs) about gender or culture can greatly influence (*color*) what is perceived.

Is There Extrasensory Perception?

Page 283: . . . uncanny . . . People who have dreams that coincide, by pure chance, with later events often have an eerie or strange (*uncanny*) feeling about the accuracy of their *apparent* precognitions.

Page 284: . . . mind-blowing performances . . . Some alleged (*so-called*) psychics, using magic tricks and not **extrasensory** ability, unethically manipulate and deceive (*exploit*) gullible (*unquestioning*) audiences with impressive and wondrous demonstrations (*mind-blowing performances*). As Myers points out, after many, many years of investigation and thousands of experiments, there is no scientific evidence that extrasensory abilities exist (believers in the paranormal need only produce one person who can demonstrate a single, reproducible ESP phenomenon to refute the claim that there is no ESP—this has not happened).